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Search History

DATE: Wednesday, March 12, 2003 Printable Copy Create Case

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DB=JPAB,EPAB; PLUR=YES; OP=OR			
L8	L7 and l6	1	L8
L7	learn$ adj (road or route)	9	L7
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L1	20010001848.pn.	0	L1

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1. Document ID: JP 2000028376 A

L8: Entry 1 of 1 File: JPAB Jan 28, 2000

PUB-NO: JP02000028376A
DOCUMENT-IDENTIFIER: JP 2000028376 A
TITLE: VEHICLE NAVIGATION SYSTEM FOR PROVIDING REAL-TIME TRAFFIC INFORMATION AND TRAFFIC ADVICE BASED ON LEARNED ROUTE

PUBN-DATE: January 28, 2000

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APPL-NO: JP11169346
APPL-DATE: June 16, 1999

INT-CL (IPC): G01 C 21/00; G08 G 1/09; G08 G 1/0969

ABSTRACT:

PROBLEM TO BE SOLVED: To achieve traffic assistance information by determining a route from the traveling data history of a vehicle experimentally, receiving real-time traffic information and comparing it with the route, and reporting to a driver when both of them correspond each other.

SOLUTION: A navigation system 1 is provided with a central processing unit(CPU) 10, a read only memory 11, a random access memory 12, and a large- capacity storage 13, and executes the following processing entirely by software. The navigation system 1 judges whether current time and date are within a prescribed commutation time frame or not and allows a driver to approve a commutation destination if they are within the prescribed commutation time frame. The system 1 receives and decodes an RTI message, compares the position information with a commutation route that has been learned in advance, outputs a commutation message when they nearly match each other, and indicates that there are problems in terms of the commutation route or a route near it with text, graphic, voice, etc., to the driver. Then, the system 1 judges whether another commutation route can be utilized or not and allows the driver to approve an alternate route.

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L7: Entry 7 of 16 File: USPT Apr 11, 2000

DOCUMENT-IDENTIFIER: US 6049753 A
TITLE: Device for searching and guiding route and for searching route

Brief Summary Text (3):
The present invention relates to a device for processing road data or intersection data and, more specifically, to a navigation device in which a route along which a moving body will travel is identified based upon map data, and the route that is identified is displayed to the operator. In particular, the invention relates to a navigation system which learns the route of travel.

Brief Summary Text (5):
A conventional navigation device has been disclosed in, for example, Japanese Unexamined Patent Publication (Kokai) No. 194473/1986. According to this navigation device, a map of a desired area is displayed on a display unit based upon the stored map data. Conditions for identifying the facilities are shown on the screen of the display unit, the conditions for identification are selected step by step, and a facility desired by the user is set as a destination.

Brief Summary Text (6):
The position of the thus set facility is indicated by a discrimination mark on the map screen. Based on the map data, furthermore, the navigation device searches a route from the present position to the facility that is set and displays the route on the screen. While the moving body is traveling along the route, the user is informed of various necessary data (road into which the moving body should enter, etc.) by voice or the like means.

Brief Summary Text (7):
This navigation device searches the routes and selects a route based upon cost of the roads or intersections memorized previously. However, a route which a driver wishes to travel sometimes does not agree with the route which the navigation device selects.

Brief Summary Text (8):
For example, the driver may wish to travel a road which the driver usually takes as the route, but the navigation device may select a different route. And the navigation device sometimes selects a route which the driver does not wish to travel. Further even if the vehicle has earlier taken a short cut to a destination through a back road, the navigation device sometimes selects a roundabout guide through a main street.

Drawing Description Text (2):
FIG. 1 is a diagram illustrating the whole apparatus of a navigation device in accordance with an embodiment;

Detailed Description Text (7):
FIG. 1 illustrates the overall apparatus of the navigation device. A central processor 1 controls the operation of the whole navigation device. The central processor 1 is provided with a CPU 2, a flash memory 3, a RAM 4, a first ROM 5, a second ROM 6, a sensor input interface 7, a communication interface 8, an image processor 9, a picture memory 10, a voice processor 11 and a clock 14. The CPU 2 and the devices through up to the clock 14 are connected together through a CPU local bus 15, and the data is exchanged among these devices.

Detailed Description Text (9):
The programs stored in the flash memory 3 are to control the display of data, to control voice guidance, etc. The ROM 5 stores figure data to be displayed and various general-purpose data. The figure data to be displayed is used for route guidance and maps depicted on the display 33. The general-purpose data include voice waveforms recording synthetic or human.voice for voice guidance, and are used for the navigation operation.

Detailed Description Text (10):
The RAM 4 stores data input from external units, a variety of parameters used for the arithmetic operations, the operation results and programs for navigation. The clock 14 comprises a counter, a battery backed-up RAM or EPROM, etc., and outputs time data.

Detailed Description Text (15):
Similarly, the beacon receiver unit 26 receives beacon signals from a data providing system such as VICS (Vehicle Information and Communication System) or the like, and the received data and the corrected data of GPS are output to the I/O data bus 28. The data transmitter/receiver unit 27 exchanges a variety of information related to the present position or the road conditions near the car relative to the bi-directional present position information providing system or the ATIS (advanced traffic information service), etc. by utilizing a cellular phone, FM multiplex signals or a telephone circuit. These items of information are used as detecting information for the car position or support information of movement. The beacon receiver unit 26 and the data transmitter/receiver unit 27 may be omitted.

Detailed Description Text (16):
The input/output device 30 comprises a display 33, a transparent touch panel 34, a printer 35 and a speaker 13. The display 33 displays guide data during the navigation operation. The touch panel 34 is constituted by a plurality of transparent touch switches that are arranged in the form of a planar matrix, and is adhered onto the screen of the display 33. By using the touch panel 34, data necessary for setting the destination, such as start point, destination, passing points, drop-in places, etc. are input to the navigation device. A printer 35 is used for printing a variety of data such as map data and guidance to facilities output through the communication interface 8. Information of various kinds is transmitted by voice to the user from the speaker 13. The printer 35 may be omitted.

Detailed Description Text (20):
The information storage unit 38 connected to the I/O data bus 28 contains the information storage medium 37 in which are stored, in a nonvolatile manner, disk management information 38a programs 38b and data 38c such as road map data necessary for the navigation operation. The disk management information 38a is related data or programs stored in the information storage medium 37, for example version information of the programs 38b. The information storage unit 38 is provided with a data transmitter/receiver 39 for reading data written into the information storage medium 37 and outputting them onto the I/O data bus 28.

Detailed Description Text (23):
In the information storage medium 37 are stored navigation processing programs and programs related to other processings executed by the CPU 2 depending upon the flow chart that will be described later as the programs 38b. These programs 38b are read out from the information storage medium 37 (external storage means/unit), and are written into the flash memory 3 (internal storage means/medium) and are stored therein (installed, transferred/copied).

Detailed Description Text (24):
The installation (transfer/copy) is automatically executed when the information storage medium 37 is installed in the navigation device, or is automatically executed when the power source circuit of the navigation device is closed, or is executed according to an operation by the operator. The information storage medium 37 can be replaced by another information storage medium 37. Thus, the program is replaced by a new one or by the latest one. By this replacement, the latest

navigation system may be used.

Detailed Description Text (25):
The information storage medium 37 stores map data, intersection data, node data, road data, photographic data, destination data, guide point data, detailed destination data, destination read data, house shape data, as well as other data and programs that are necessary for the navigation operation as the data 38c. In accordance with these programs, the navigation operation is executed by using the road map data stored in the information storage medium 37. The program for navigation is read by the data transmitter/receiver 39 from the information storage medium 37, and is installed, copied and written into the flash memory 3 or the RAM 4. Other data include indication guide data, voice guidance data, picture data showing a simple guide route, etc.

Detailed Description Text (28):
The locus data include node data 55, link data 60 and intersection data 65 of the roads and intersections along which the vehicle has traveled, and the roads along which the vehicle has traveled are shown on the map. The navigation device searches a new route by utilizing the locus data.

Detailed Description Text (35):
The traveled distance data ML represent a distance traveled by the vehicle and is based on the data from a distance sensor 23. The present position data PI is related to the present position and is input from a beacon receiver 26 or a data transmitter-receiver 27. The VICS data VD and ATIS data AD are input from the beacon receiver 26 or the data transmitter-receiver 27. The VICS data VD are used for correcting an error in the position of the vehicle detected by a GPS receiver 25. The ATIS data AD are used for determining traffic regulations and traffic jams in the area. When the map data is exchanged between the navigation device and the area monitoring center, relying upon the VICS data VD or the ATIS data AD, the guide route may be identified by using such data.

Detailed Description Text (36):
The inputted destination data TP is related to the coordinate positions and names of the destinations and is input by the user. The start point of route data SP is map coordinate data of a point from where the navigation operation starts. The end point of route data ED is map coordinate data of a point where the navigation operation ends.

Detailed Description Text (78):
FIG. 9 is a flow chart of the main routine executed by a CPU 2 in use of the navigation device according to the present invention. The processing starts upon closing the power source circuit and ends upon breaking the power source circuit. The power source is turned on or off as the power source of the navigation device is turned on or off, or as the engine start key (ignition switch) of the vehicle is turned on or off.

Detailed Description Text (79):
First, the initialization is executed (step SA1). In initializing, a program for navigation is read out from the data region 38c of the data storage unit 37, copied into a flash memory 3, and is executed. The CPU 2 clears the general-purpose storage areas in the RAMs, such as work memory of a first RAM 5 and an image memory 10.

Detailed Description Text (80):
Then, a step for detecting the present position (step SA3) and the subsequent steps are executed. In detecting the present position (step SA3) the detector 20 detects the geographical coordinates (latitude, longitude, altitude, etc.) of an overland moving body, i.e., of a vehicle mounting the navigation device. That is, a GPS receiver 25 receives signals from a plurality of satellites orbiting around the earth, detects coordinate positions of the satellites, times at which the electromagnetic waves are emitted from the satellites and the time at which the electromagnetic waves are received by the GPS receiver 25, and calculates the distances to the satellites. The coordinate position of the vehicle is calculated from the distances to the satellites, to detect the present position of the vehicle. The thus found geographical coordinate data of the vehicle is stored in the first

RAM 5 as present position data MP. The present position data MP is often corrected by the data input through a beacon receiver 26 or a data transmitter-receiver 27.

Detailed Description Text (232):
The routes are freely selected as guide routes and are specified by the user. In FIG. 35, for example, a portion of the guide route 88 is used from the start point node 82 to the node NOD27, and the locus route KR3 is used from the node NOD27 to the node NOD22. Then, a route is selected to once return to the node NOD24 from the node NOD22, and the locus route KR1 is selected from the node NOD24 to the destination node 80. These routes form a guidance route for navigation. In calculating the running cost, furthermore, the times required for passing the links may be calculated and a guide route may be determined depending upon the required times. Moreover, the times required for running the links and the times TSU required for passing the intersections may be accumulated to find the time required for running the whole locus route that is identified, and these times may be displayed on the screen at the time of displaying the route.

Detailed Description Text (248):
FIG. 27 is a flow chart of a second embodiment of the processing for deleting locus data (step SA19) of FIG. 9. In the second embodiment, the locus data are forcibly deleted by the user. First, when an instruction for deleting locus data of locus data storage unit 40 is input to the navigation device through a touch switch 34 (step SK31), a value that is adapted to a processing for forcible deletion is substituted for the threshold value ZZ. The threshold value ZZ used here is different from the threshold value ZZ used in the first embodiment. The link data 60 stored in the locus data storage unit 40 are rearranged in the order of from the oldest traveled date-and-hour data SND to the latest traveled date-and-hour date SND (step SK35).

Detailed Description Text (268):
Like in the aforementioned embodiments, the overall processing of FIG. 29 starts upon closing the power source circuit and ends upon turning the power source off. The power source is turned on or off upon turning the power source of the navigation device on or off, or upon turning the engine start key (ignition switch) of the vehicle on or off. The point where the ignition switch is turned off is substantially the same as the point where the ignition switch is turned on.

Detailed Description Text (269):
In FIG. 29, first, initialization is effected (step SA1). In the initialization, a program for navigation is read out from the data region 38c of the data storage unit 37, and is copied onto the flash memory 3, so that the program of the flash memory 3 is executed. The CPU 2 clears the general-purpose data storage areas in the RAMs such as work memory in the first RAM 5 and the image memory 10.

Detailed Description Text (294):
According to the routine for deleting locus data of the fourth embodiment shown in FIG. 30, as described above, it is determined whether or not the locus data related to the locus of current travel near the navigation operation end point (near the destination) is stored in the locus data storage unit 40. When the links related to the locus of travel of this time are those links that were traveled in the past, the numbers of times of travel in the past are also shown.

Detailed Description Text (308):
According to the navigation device of the present invention as described above, the traveling route of the vehicle is stored as locus data in the locus data storage unit 40, and a guide route is identified by using locus data stored in the locus data storage unit 40. Therefore, the roads preferred by the user are preferentially identified as a guide route. Even a road that is newly constructed and has not been stored in the data storage unit 37, can be stored as a route in the locus data storage unit 40, making it possible to identify a guide route based on the latest road conditions.

Detailed Description Text (309):
Not being limited to the above-mentioned embodiments only, the present invention can be modified in a variety of ways without departing from the gist and scope of the

invention. In the above-mentioned embodiments, for example, the first RAM 5 may be a writable recording medium such as floppy disk or the like. Furthermore, the navigation device may be equipped with a voice input unit having an analog-to-digital converter. A command may be input to the navigation device by a voice instruction input through the voice input unit.

Detailed Description Text (310):
In the navigation device according to the present invention, the function of the locus data storage unit 40 may be provided in the data management center, and the data may be exchanged through VICS, ATIS or the like unit. That is, the locus data related to a route traveled by the vehicle are transmitted to a main storage unit in the data management center through the data transmitter-receiver 27, and are successively stored. The processing for searching a route at the step SA7 is carried out at the data management center by using the locus data stored therein.

Detailed Description Text (311):
The data such as conditions for searching destinations such as nearby facilities and conditions for searching a route are sent from the navigation device to the data management center. Based upon these conditions sent from the navigation device, the data management center identifies desired facilities or searches a route to the destination. The data related to the results of identification, picking-up and search are transmitted together with map data to the navigation device from the data management center. Based upon the results of identification, picking-up and search that are received, the navigation device shows the identified facilities on the display 33. Thus, the facilities are identified, picked up and searched based upon the detailed and latest data of the facilities in the vicinity of the present position of the vehicle. In identifying the facilities, furthermore, changes in the environment (newly determined one-way roads, etc.) of the roads can be taken into consideration. In this case, the data related to the facilities stored in the data management center are continuously updated.

Detailed Description Text (312):
All routines except that for guiding and displaying a route in shown FIG. 9 (step SA13) need not be executed according to the program 38b stored in the data storage unit 37 but may instead be executed in the data management center. In this case, map data preserved in the data management center is used instead of map data stored in the data region 38c of data storage unit 37, and the data related to a locus of travel of the vehicle is stored and preserved in the data management center. Besides, the present position of the vehicle is detected by using data signals exchanged relative to the data management center. Therefore, the navigation device executes only a routine for guiding and displaying a route, a routine for generating locus data of travel based on the map data transmitted from the data management center, and a routine for transmitting locus data to the data management center. Then, a route can always be identified based upon the latest road data and map data, and more locus data can be stored, and the constituent members of the navigation device as a whole can be decreased.

Detailed Description Text (314):
The data storage medium 37 can be used in a computer installed in a room, in a portable computer, or in any other computer. Then, the aforementioned navigation processing can be executed in a place other than in the vehicle. For instance, a map can be displayed, motion can be simulated from the present position to the destination, and distance can be calculated among all points along the roads on the map. The portable navigation device can be carried for performing outdoor activities such as cycling, travel, mountain climbing, hiking, fishing, etc.

Detailed Description Text (315):
The program and/or the data may be sent (transmitted) to the flash memory 3 from an external system via the data transmitter/receiver unit 27. The external system is a system for feeding the present position data to a data processing center of ATIS (Advanced Traffic Information Service). The external system is installed remote from the navigation device. The program is sent to the navigation device and is designated so as to be installed (transferred/copied) in the flash memory 3.

Detailed Description Text (316):

The routine for detecting the present position (step SA3), the input of a point (step SA6), the searching of a route (step SA7), the detecting of the present position (step SA9), the guidance and display of the route (step SA13), the processing of a traveling position (step SA15), the deletion of locus data (step SA19) and the confirmation of storage of locus data (step SA21) may be executed by the above-mentioned external system. The results of execution and map data are sent (transmitted) to the navigation device from the external system. Based upon the results of execution and map data that are received, the navigation device displays road data and route guide. In this case, the road data, map data, facility data and traffic jam data are processed and controlled at the same time by the external system, making it possible to search a route and to set points in an optimum manner.

Detailed Description Text (317):
The program is automatically executed when the data storage medium 37 is inserted in the navigation device, or when the power source circuit of the navigation device is closed, or when started by the operator. The program and the data are not stored in the RAM 4 in a non-volatile manner and, hence, the installation is executed every time when the power source circuit is closed. When the data can be read out at high speeds from the data storage medium 37, the CPU 2 may directly read the program from the data storage medium 37. The flash memory 3 may be a battery backed-up RAM, an IC memory card or an EPROM.

Detailed Description Text (318):
The present invention can be further adapted as a navigation device for guidance of a person and as vehicles other than a car,vehicles other than a car, for ships and for aircraft. Moreover, the map used for the navigation may be a marine chart or a sea bottom chart instead of a road map.